

**RECEIVED
CENTRAL FAX CENTER****JUL 12 2006****REMARKS**

Claims 1-41 remain pending in the application. Reconsideration is respectfully requested in light of the following remarks.

Section 102(e) Rejection:

The Examiner rejected claims 1, 2, 6-12, 14-18, 22-28, 30 and 34-40 under 35 U.S.C. § 102(e) as being anticipated by Yakir et al. (U.S. Publication 2004/0049513) (hereinafter "Yakir"). Applicants respectfully traverse this rejection for at least the reasons presented below.

Regarding claim 1, Yakir does not disclose file system software comprising a multi-class storage mechanism, wherein the multi-class storage mechanism is configured to monitor access of data stored in a multi-class file system comprising a hierarchy of storage classes to generate access information for the data, wherein each storage class comprises one or more storage devices assigned to the storage class according to one or more characteristics of the storage class. Yakir teaches a multi-disk and multi-volume system, but does not disclose a hierarchy of storage classes where each storage class comprises storage devices assigned to the storage class *according to characteristics of the storage class*. The Examiner cites paragraphs [0020], [0070], [0090] and [0092] of Yakir, asserting that Yakir's "storage units 102 may be organized into one or more logical storage units/devices 104" and that a "logical storage unit may reside on non-continuous physical partitions." However, Yakir does not mention anything about a multi-class file system including *a hierarchy of storage classes*, where each storage class includes storage devices assigned to the storage class *according to characteristics of the storage class*. Instead, Yakir merely discloses multiple storage devices and multiple logical storage units. The fact that Yakir's system includes multiple storage devices/units does not disclose the specific limitations of a multi-class file system including *a hierarchy of storage classes* and storage devices assigned to a storage class *according to characteristics of the storage class*.

In the Response to Argument, the Examiner argues that Yakir's servers (S1, S2 and S3) are equivalent to the storage classes of Applicants' claims. Applicants respectfully disagree. Yakir does not teach that the servers of his system represent a hierarchy of storage classes in which each storage class includes storage devices assigned to the storage class, according to characteristics of the storage class. Additionally, Yakir teaches the use of logical storage units, which the Examiner equates to the storage devices of Applicants' claims. However, Yakir specifically teaches that a "single logical storage unit may span storage space provided by multiple physical storage units" and that a "single physical storage unit may be divided into several separately identifiable logical storage units" (paragraph [0020]). Yakir also clearly states that a physical storage unit, as opposed to a logical storage unit, "is intended to refer to any physical device, system, etc. that is capable of storing information or data" (paragraph [0019]). Thus, Yakir's logical storage units are not storage devices, as the Examiner contends.

The Examiner also refers to Yakir's mention of Hierarchical Storage Management (HSM) applications, citing paragraphs [0004] and [0046]. However, Applicants' argument is not that Yakir never mentions HSM applications, but that Yakir does not disclose a hierarchy of storage classes where *each storage class comprises storage devices* assigned to the storage class *according to characteristics of the storage class*, as argued above. Paragraphs [0004] and [0046] describe stub files, which Yakir describes as a physical file that represent a migrated file. Neither of the cited paragraphs ([0004] and [0046]) supports the Examiner contention that Yakir discloses a hierarchy of storage classes where *each storage class comprises storage devices* assigned to the storage class *according to characteristics of the storage class*. The fact that Yakir's system includes a stub file that "stores information that enables a migrated file to be recalled" does not in any way imply the use of a hierarchy of storage classes where *each storage class comprises storage devices* assigned to the storage class *according to characteristics of the storage class*, as recited in Applicants' claim.

The Examiner also asserts that each of Yakir's storage units "is generally identifiable by a unique identifier that may be specified by the administrator." However, providing a unique identifier for storage unit does not disclose assigning storage units to storage classes *according to one or more characteristics of the storage class*. The unique identifiers to which the Examiner refers merely allow each storage unit to be uniquely addressed. Yakir does not mention anything about the unique identifiers being characteristics of any storage class. Thus, Yakir fails to disclose wherein each storage class comprises one or more storage devices assigned to the storage class according to one or more characteristics of the storage class.

Furthermore, the Examiner argues in the Response to Arguments that Yakir's use of a unique identifier for each logical storage unit "discloses characteristics of the storage class", citing paragraph [0020]. The Examiner's is clearly incorrectly interpreting the teachings of Yakir. Nowhere does Yakir describe a logical storage unit's identifier as representing any sort of characteristic of a storage class. The mere fact that a logical storage unit may be assigned a unique identifier by an administrator does not imply any sort of characteristic of the logical storage unit. Additionally, the Examiner's has already argued that Yakir's servers (S1, S2, and S3) are equivalent to storage classes and also argued (erroneously) that Yakir's logical storage units are equivalent to storage devices. Thus, the Examiner's is contradicting herself. On one hand the Examiner argues that Yakir's logical storage units are storage devices (and that the servers are storage classes) and on the other hand the Examiner argues that a logical storage unit's unique identifier is a characteristic of a storage class. The Examiner cannot have it both ways. The unique identifier for a logical storage unit, which the Examiner considers a storage device, cannot also be a characteristic of a storage class, which the Examiner considers to be equivalent to Yakir's servers.

Further regarding claim 1, Yakir also fails to disclose a multi-class storage mechanism configured to apply the access information to a set of policies for the multi-class file system. The Examiner cites FIG. 1, item 114 and paragraph [0023] of Yakir. However, item 114 of FIG. 1 and paragraph [0023] merely disclose that Yakir system

includes "information 114 related to storage policies and rules configured for the storage environment" (Yakir, paragraph [0023]). Yakir does not, however, teach anything regarding applying access information (generated from the monitoring of data stored in a multi-class file system) to a set of policies for the multi-class file system. Yakir does not teach anything regarding applying any access information to the storage policies and rules of information 114. Nor does Yakir describe applying access information to any other set of policies. The mere existence of storage policies does not inherently include or imply applying access information to storage policies. Without some specific disclosure by Yakir regarding applying access information to a set of policies, Yakir cannot be said to anticipate a multi-class storage mechanism configured to apply access information to a set of policies for a multi-class file system.

In the response to arguments, the Examiner cites paragraphs [0023] and [0046] and argues that in Yakir's system information used to find or locate migrated data may be stored in the same database as "information related to storage policies and rules configured for the storage environment". However, the sentence cited by the Examiner is the only reference by Yakir to such policies or rules. Thus, the Examiner is arguing that since Yakir mentions that information used to locate migrated data may be stored together with (in the same database as) "information related to storage policies", Yakir somehow discloses the specific limitation of applying access information to a set of policies for a multi-class file system, as recited in Applicants' claim. The Examiner's position clearly goes beyond the actual teachings of Yakir. A single sentence stating that location information and "information related to policies" may be stored in the same database does not, in any way, *disclose* applying access information to a set of policies. Storing different types of information together does not imply that one set of information is *applied* to the other.

Additionally, Yakir fails to disclose a multi-class storage mechanism configured to migrate a portion of the data to different storage classes in the hierarchy of storage classes in response to the application of access information to the set of policies for the multi-class file system. The Examiner cites the same portions of Yakir (FIG. 1, item 114

and paragraphs [0020], [0023], [0070], [0090] and [0092]). However, none of the cited passages mentions anything about migrating data to different storage classes *in response to the application of access information* to the set of policies. The Examiner refers to Yakir's teachings regarding migrating a stub file from one storage unit to another, but fails to cite any portion of Yakir that discloses migrating a stub file **in response to the application of access information to a set of policies**. Instead, Yakir teaches that a stub file is migrated in response to an originating server receiving a signal to move a stub file and that "[t]he signal may be received from a user, an application or program, or from other like source" (Yakir, paragraph [0063]). Thus, Yakir discloses migrating a stub file in response to a signal from a user, application or a similar source. A signal from a user or an application cannot be considered an application of access information to a set of policies. Yakir clearly does not describe migrating data in response to the application of access information to a set of policies.

In the Response to Arguments, the Examiner cites paragraph [0011] of Yakir referring to Yakir's teachings that "information (such as information 11 related to policies) can be used to determine the location of the migrated data" (parenthesis by Examiner). However, the Examiner's argument fails to support the Examiner's position. Firstly, the cited paragraph does not support the Examiner's contention that "information related to policies" can be used to determine the location of migrated data. Instead, paragraph [0011] states that a stub file stores information that can be used to determine the location of migrated data. Secondly, the fact that information (whether related to policies or not) may be used to locate *migrated* data, i.e. data that has already be migrated does not disclose migrating data to different storage classes *in response to* applying access information to a set of policies. The Examiner's argument that after being migrated, information related to policies may be used to located the migrated data says nothing about whether the data was migrated in response to anything.

Applicants remind the Examiner that anticipation requires the presence in a single prior art reference disclosure of cach and every limitation of the claimed invention, arranged as in the claim. M.P.E.P 2131; *Lindemann Maschinenfabrik GmbH v. American*

Hoist & Derrick Co., 221 USPQ 481, 485 (Fed. Cir. 1984). The identical invention must be shown in as complete detail as is contained in the claims. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). As discussed above, Yakir fails to disclose a multi-class storage mechanism configured to monitor access of data stored in a multi-class file system comprising a hierarchy of storage classes to generate access information for the data, wherein each storage class comprises one or more storage devices assigned to the storage class according to one or more characteristics of the storage class. Yakir further fails to disclose that the multi-class storage mechanism is configured to apply the access information to a set of policies for the multi-class file system and to migrate a portion of the data to different storage classes in the hierarchy of storage classes in response to the application of access information to the set of policies for the multi-class file system. Therefore, Yakir cannot be said to anticipate claim 1.

For at least the reasons above, the rejection of claim 1 is not supported by the cited art and removal thereof is respectfully requested. Similar remarks apply to claims 14, 16 and 30.

Regarding claim 15, Yakir fails to disclose a system including means for means for implementing a multi-class file system including a hierarchy of storage classes on a plurality of storage devices, where each storage class includes one or more of the storage devices assigned to the storage class according to one or more characteristics of the storage class. Please refer to the remarks above regarding claim 1, for a detailed discussion of Yakir's failure to disclose a multi-class file system including a hierarchy of storage classes on a plurality of storage devices, where each storage class includes one or more of the storage devices assigned to the storage class according to one or more characteristics of the storage class.

Yakir further fails to disclose software means for assigning a migrating data to different storage classes in the hierarchy of storage classes according to a set of policies for the multi-class file system. The Examiner does not cite any portion of Yakir that describes migrating data to different storage classes in a hierarchy of storage classes.

Yakir only mentions that data may be migrated from an original storage location on an original volume to a repository storage location on a repository volume and that a stub file may also be migrated from an original storage location to another storage location. However, Yakir does not mention migrating data to *different storage classes in a hierarchy of storage classes*. In fact, Yakir makes not mention of different storage classes at all. The Examiner equates the mere fact that Yakir's system includes multiple physical storage devices and multiple logical storage units as including a hierarchy of storage classes. However, merely providing multiple physical storage devices and multiple logical storage units does not disclose anything regarding *different storage classes* or about a *hierarchy* of storage classes.

Nor does having multiple physical/ logical storage units disclose anything about migrating data according to a set of policies for a multi-class file system. Yakir merely describes the existence of storage policies and rules (Yakir, paragraph [0023]), but fails to disclose migrating data to different storage classes according to a set of policies. As noted above regarding claim 1, Yakir described migrating a stub file in response to receiving a signal from a user, application, program, or other like sources. Nowhere does Yakir mention anything regarding migrating data according to a set of policies.

Thus, the rejection of claim 15 is not supported by the cited art and removal thereof is respectfully requested.

Regarding claim 2, Yakir fails to disclose file system software that includes file system functionality configured to implement the hierarchy of storage classes of the multi-class file system. The Examiner cites paragraphs [0020], [0070], [0090] and [0092] of Yakir and asserting that in Yakir's system, "[p]hysical storage units 102 may be organized into one or more logical storage units/devices 104" and that a "logical storage unit may reside on non-[contiguous] physical partitions." However, as noted above regarding the rejection of claim 1, merely having multiple physical and logical storage units where a logical storage unit may reside on non-contiguous physical partitions does not disclose or imply a hierarchy of storage classes. Thus, Yakir fails to

disclose a hierarchy of storage classes. Additionally, Yakir fails to disclose file system functionality configured to implement the hierarchy of storage classes. Yakir only teaches that data may be migrated from an original storage location to another storage location but makes no mention of any file system functionality configured to implement a hierarchy of storage classes. Thus, the rejection of claim 2 is not supported by the cited art and removal thereof is respectfully requested. Similar remarks also apply to claim 18.

Regarding claim 7, Yakir fails to disclose where the multi-class storage mechanism is configured to modify file system metadata for the migrated data to indicate the different storage classes for the migrated data. The Examiner cites paragraphs [0049-0053] of Yakir. This portion of Yakir describes that data, metadata and stub files may be migrated but does not mention anything regarding modifying metadata to indicate different storage classes for migrated data. Yakir does not disclose any kind of indication of different storage classes for migrated data, either in metadata or elsewhere. Merely describing that data, metadata and stub files can be migrated does not disclose the specific limitation of modifying file system metadata to indicate different storage classes for the migrated data.

In the Response to Arguments, the Examiner cites paragraphs [0067] and [0078] of Yakir, referring to Yakir teaching regarding "the originating server modify/update information stored in a database". However, the sentence cited by the Examiner (in both paragraph [0067] and paragraph [0078]) actually states, "[t]he originating server may modify/update information stored in a database ... using database update techniques such as ODBC techniques." In fact, both cited paragraphs are about techniques used to inform storage management server (SMS) 110 regarding a stub file. In one case (paragraph [0067]) Yakir teaches that SMS 110 is informed that a stub file now resides on a different volume and in the other case (paragraph [0078]) Yakir teaches that SMS 110 is informed that a stub file is no longer eligible for remigration. Nothing in the cited passages has anything to do with modified file system metadata for migrated data to indicate the different storage classes for the migrated data. Informing a server that a stub file is on a different volume does not imply that the different volume is on a different storage class

and information a server that a stub file is ineligible for remigration also fails to imply anything about indicating different storage classes for the migrated data.

Thus, the rejection of claim 7 is not supported by the cited art and removal thereof is respectfully requested. Similar remarks also apply to claims 23 and 35.

Regarding claim 11, Yakir fails to disclose file system software that is configured to add a new storage class to the hierarchy of storage classes. The Examiner cites paragraph [0006] of the background section of Yakir and refers to Yakir's teaching regarding reorganizing data when deploying new servers. However, the cited passage of Yakir does not describe anything about adding a new storage class to a hierarchy of storage classes. Instead, the cited passage describes how stub files may be moved from one storage location to another for various reasons, including reorganizing data when deploying new servers and storage devices. No mention is made about *adding a new storage class* to a hierarchy of storage classes. In fact, nowhere does Yakir mention file system software configured to add a new storage class to the hierarchy of storage classes.

In the Response to Arguments the Examiner argues that merely by describing that a stub file may be moved "from its present location to a new destination storage location" Yakir discloses file system software that is configured to add a new storage class to the hierarchy of storage classes. Applicants respectfully disagree with the Examiner's interpretation. Merely moving a stub file, or other data, to a new destination does not in any way imply that a new storage class is added to a hierarchy of storage classes. Data can be moved between locations within a single volume, devices, and certainly with a single storage class. Moreover, even if data is moved from one storage class to another, that does not necessarily involve adding a new storage class to a hierarchy of storage classes. The mere fact that Yakir mentions that a stub file may be moved to a new destination storage location" clearly does not disclose file system software that is configured to add a new storage class to the hierarchy of storage classes.

Thus, for at least the reasons above, the rejection of claim 11 is not supported by the cited art and removal thereof is respectfully requested. Similar remarks also apply to claims 27 and 39.

Section 103(a) Rejections:

The Examiner rejected claims 3-5, 13, 19-21, 29, 31-33 and 42 under 35 U.S.C. § 103(a) as being unpatentable over Yakir in view of Leung et al. (U.S. Publication 2004/0039891) (hereinafter "Leung"), and claims 5, 21 and 33 as being unpatentable over Yakir in view of Gill (U.S. Patent 6,947,959). Applicants respectfully traverse the rejections of these claims for at least the reasons presented above regarding their respective independent claims.

Further regarding claim 3, Yakir in view of Leung does not teach or suggest storage classes that are ordered in a hierarchy of storage classes according to performance characteristics from a highest storage class comprising high-performance storage devices to a lowest storage class comprising low-performance storage devices. The Examiner admits that Yakir does not teach storage classes ordered in a hierarchy according to performance characteristics but relies upon Leung, citing paragraphs [0037-0038] and [0053-0054]. However, none of the cited paragraphs mentions storage classes ordered in a hierarchy of storage classes *according to performance characteristics*. Instead, the cited paragraphs describe storage units may be classified into groups according to the data storage cost, such as a monetary value of storage data per unit of storage. Yakir also describes using other criteria, such as volume capacity, manufacturer, or device type, to group storage units. However, Leung fails to mention anything regarding storage classes ordered according to performance characteristics.

Yakir and Leung, whether considered singly or in combination, fail to teach or suggest storage classes that are ordered in a hierarchy of storage classes according to performance characteristics from a highest storage class comprising high-performance storage devices to a lowest storage class comprising low-performance storage devices.

In the Response to Arguments, the Examiner cites paragraphs [0070] and [0091] and arguing that "rank" and "order" are equivalent. First of all the Examiner fails to state whether the cited paragraphs are from Yakir or Leung. Furthermore, paragraphs [0070] and [0091] of both Yakir and Leung fail to mention anything regarding storage classes that are ordered (or ranked) in a hierarchy according to performance characteristics from a highest storage class comprising high-performance storage devices to a lowest storage class comprising low-performance storage devices.

Paragraph [0070] of Yakir states that a stub file may be moved "without recalling migrated data associated with the stub file". Paragraph [0091] of Yakir describes that data locator information is stored in a stub file and that moving the stub file from the originating storage location to the destination storage location essentially moves the information stored by the stub file from the originating storage location to the destination storage location.

Paragraph [0070] of Leung states that when an overcapacity condition (e.g., when the used storage capacity for a volume exceeds a user-configured threshold value) is detected, a target volume is then automatically and dynamically determined for receiving files from the source volume to resolve the overcapacity condition and that data is moved from a source volume to a target volume that has a lower storage data cost associated with it. However, moving data to a volume that has lower storage data cost does not disclose storage classes that are ordered in a hierarchy of storage classes according to performance characteristics from a highest storage class comprising high-performance storage devices to a lowest storage class comprising low-performance storage devices. Storage cost and performance are two different things.

Paragraph [0091] of Leung describes file groups. Leung teaches that a file is included in a file group if the file satisfies criteria specified for the file group and that the file group criteria may be specified by the administrator or some other user. Leung give the example that an administrator may create file groups based upon a business value

associated with the files where the administrator may group files that are deemed important or critical for the business into one file group (a "more important" file group) and the other files may be grouped into a second group (a "less important" file group). However, grouping files is not the same as storage classes that are ordered in a hierarchy of storage classes according to performance characteristics. Additionally, the Examiner has previously argued that Yakir's servers S1, S2 and S3, not Leung file groups are storage classes. Grouping files as taught by Leung does not teach or suggest ordering storage classes (or Yakir's servers) according to performance characteristics.

Thus, for at least the reasons above, the rejection of claim 3 is not supported by the cited art and removal thereof is respectfully requested. Similar remarks also apply to claims 19 and 31.

Regarding the section § 102 and § 103 rejections, Applicants also assert that numerous other ones of the dependent claims recite further distinctions over the cited art. However, since the rejections have been shown to be unsupported for the independent claims, a further discussion of the dependent claims is not necessary at this time.

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CONCLUSION

Applicants submit the application is in condition for allowance, and prompt notice to that effect is respectfully requested.

If any fees are due, the Commissioner is authorized to charge said fees to Meyertons, Hood, Kivlin, Kowert, & Goetzel, P.C. Deposit Account No. 501505/5760-14900/RCK.

Also enclosed herewith are the following items:

- ☐ Return Receipt Postcard
- ☐ Petition for Extension of Time
- ☐ Notice of Change of Address
- ☐ Other:

Respectfully submitted,



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